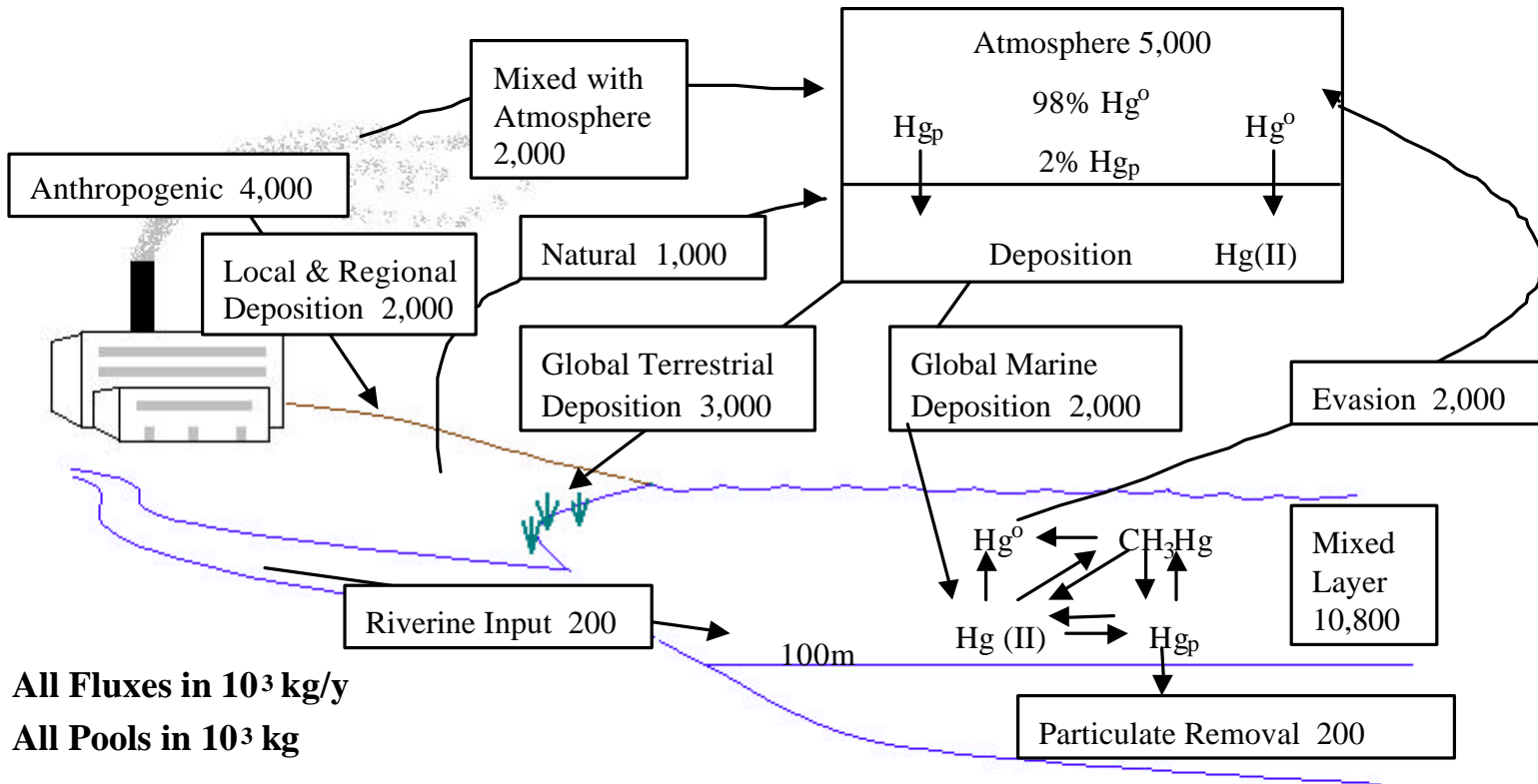


Current Global Mercury Cycle

- More than half, probably about 80%, of current mercury emissions are human-caused (anthropogenic)
- Levels in the surface layer (top 100 m) of the ocean are estimated to be about 3X pre-industrial levels, due to anthropogenic emissions
- Increased levels are also found in freshwater systems
- It is clear that anthropogenic emissions lead to increased levels in fish

The Current Global Mercury Cycle



All Fluxes in 10^3 kg/y

All Pools in 10^3 kg

Hg_p = mercury associated with particles

Hg^0 = elemental mercury

$Hg(II)$ = oxidized mercury

CH_3Hg = methylmercury

kg = kilograms

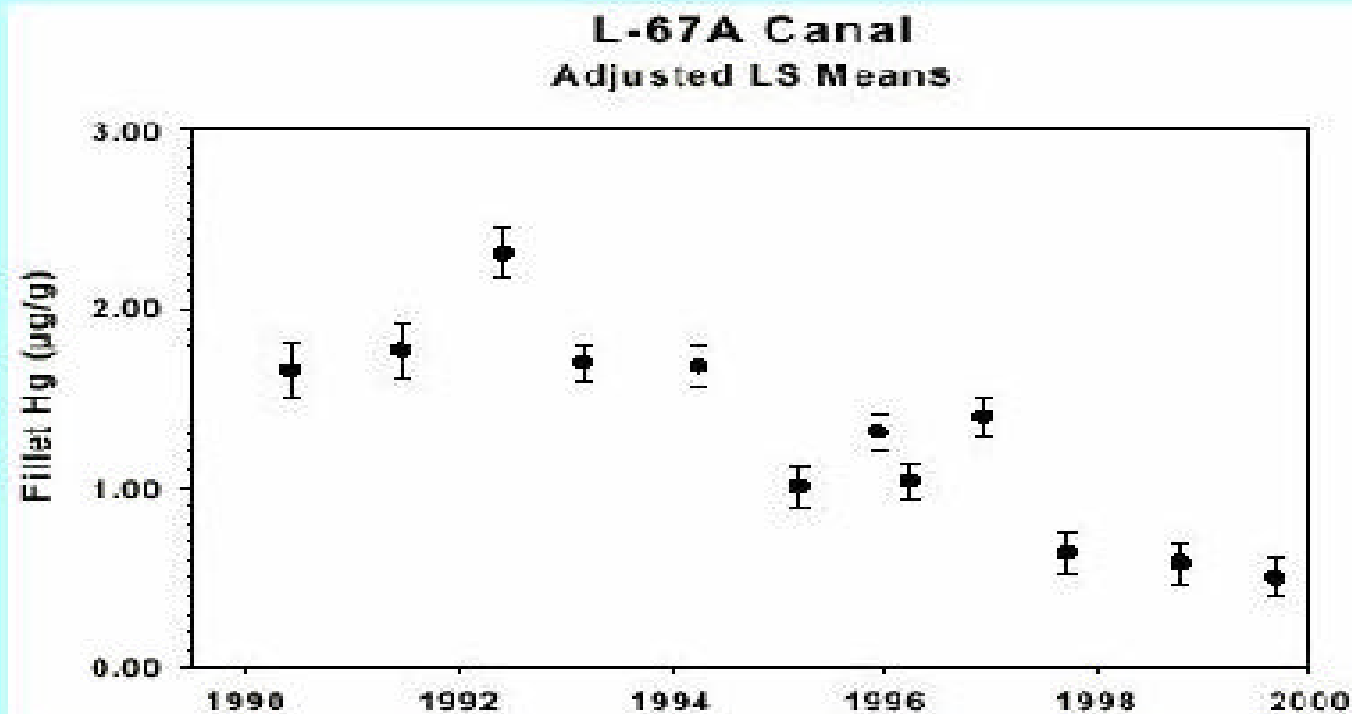
kg/y = kilograms per year

Adapted from: Mason, R.P., W.F. Fitzgerald, & F.M.M. Morel, 1994,
Biogeochemical cycling of elemental mercury: Anthropogenic influences,
Geochimica et Cosmochimica Acta., Vol. 58, pp. 3191-3198.

Reductions in emissions expected to lead to relatively rapid reductions in concentrations in fish

- Modeling studies in Florida and preliminary studies in NY/NJ Harbor suggest that, if fresh sources of mercury were eliminated, levels in fish could decline by half in 10 to 20 years or less.
- Fish sampling in Florida shows relatively rapid declines in fish following emission reductions in early 90s.

Changes in Mercury Concentration in Tissue of Largemouth Bass in a Florida Everglades Location in Conjunction with Reductions of Emissions of Mercury from Local Sources

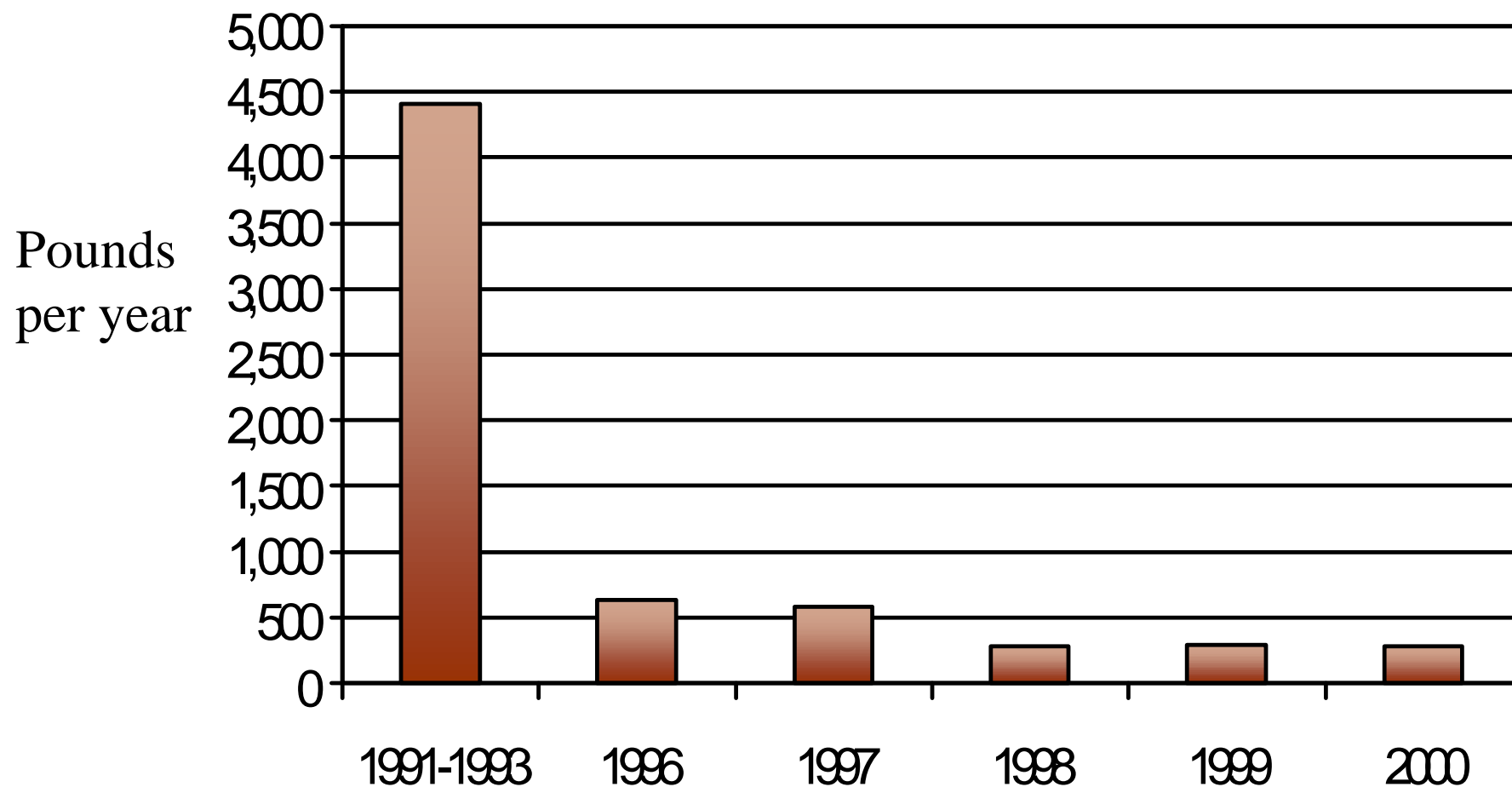


Mercury in fillets of age-standardized largemouth bass in Everglades Canal L-67 (Lange et al., 2000). Adjusted least square means.

Prior emissions reductions efforts have succeeded

- First NJ Mercury Task Force recommended reductions in emissions from municipal solid waste (MSW) incineration
- Implementation of source reduction and stack controls in NJ has led to dramatic decline in emissions from MSW and medical waste incineration

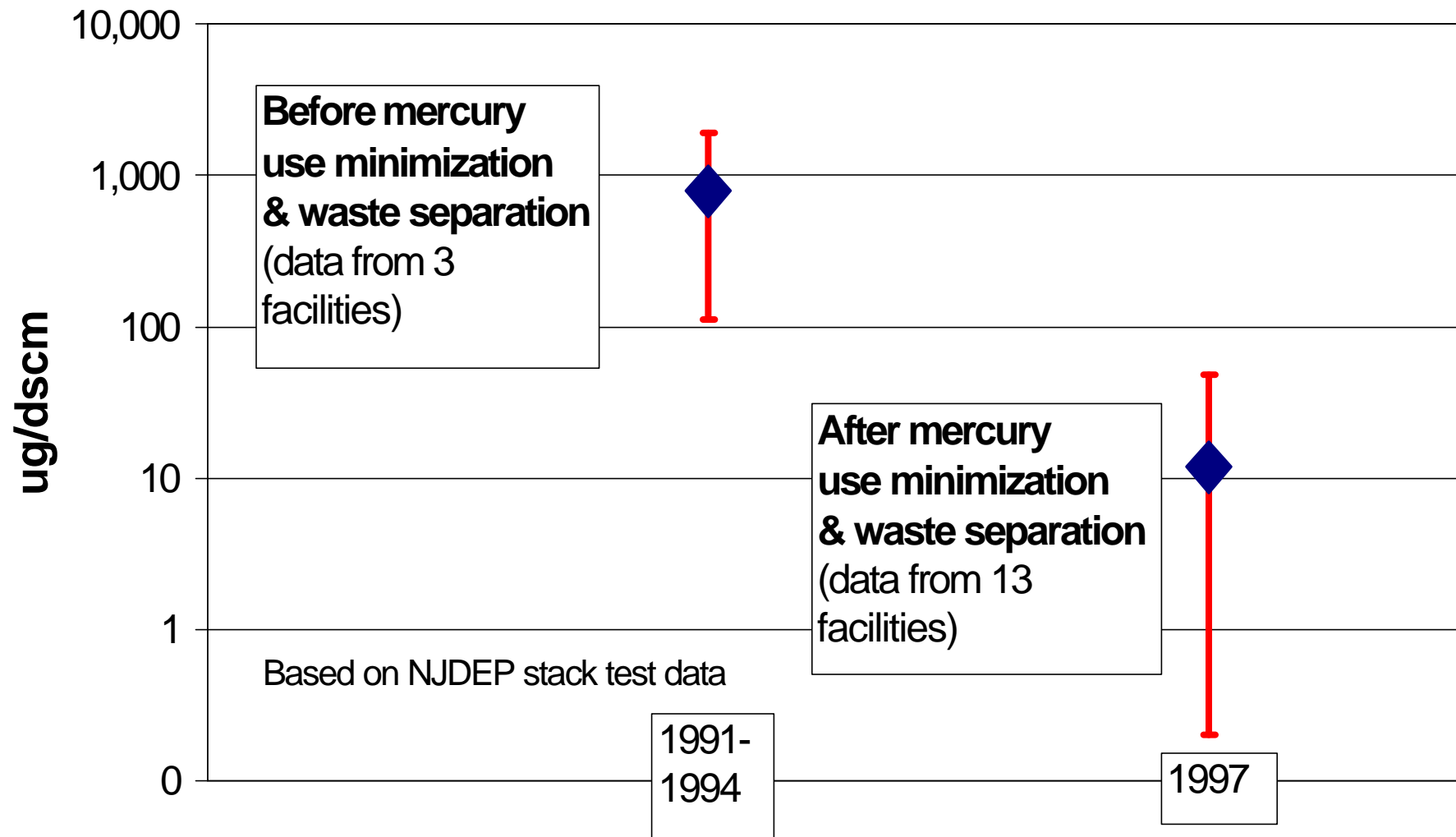
Annual Mercury Emissions from NJ Municipal Solid Waste Incinerators



NJ Medical Waste Incinerator Emissions

Stack gas concentrations: mean & range

(Note: concentrations shown on log scale due to large range)

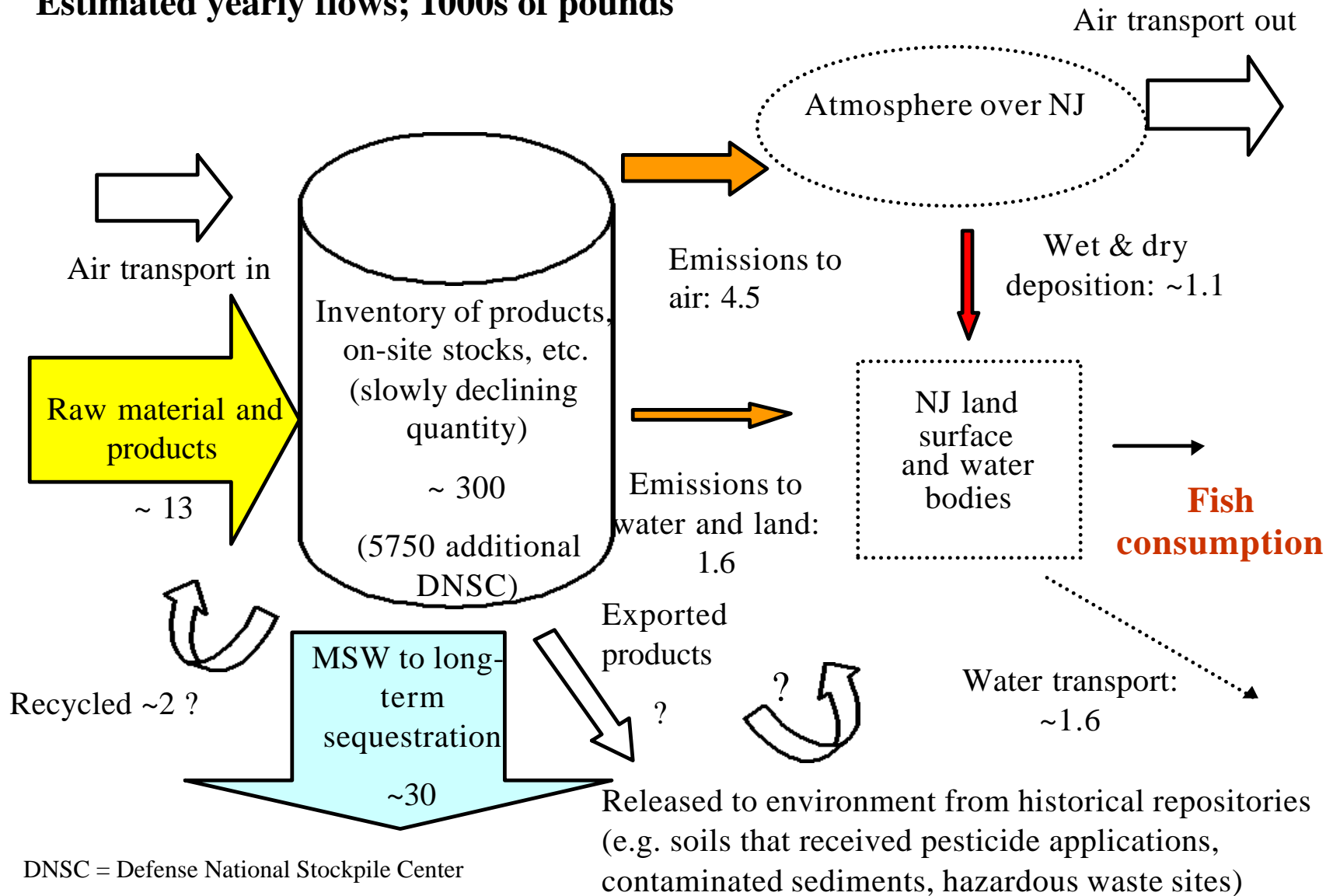


Large emissions of mercury still exist

- Materials accounting of mercury shows large flows, and identifies areas where more knowledge needed
- Emissions to air are important; relatively large emissions from some sources still exist
- Atmospheric deposition, of which $\frac{1}{3}$ or $\frac{1}{2}$ is from local and regional sources, contributes significant amount of mercury to NJ environment

New Jersey Mercury Materials Accounting

Estimated yearly flows; 1000s of pounds



DNSC = Defense National Stockpile Center

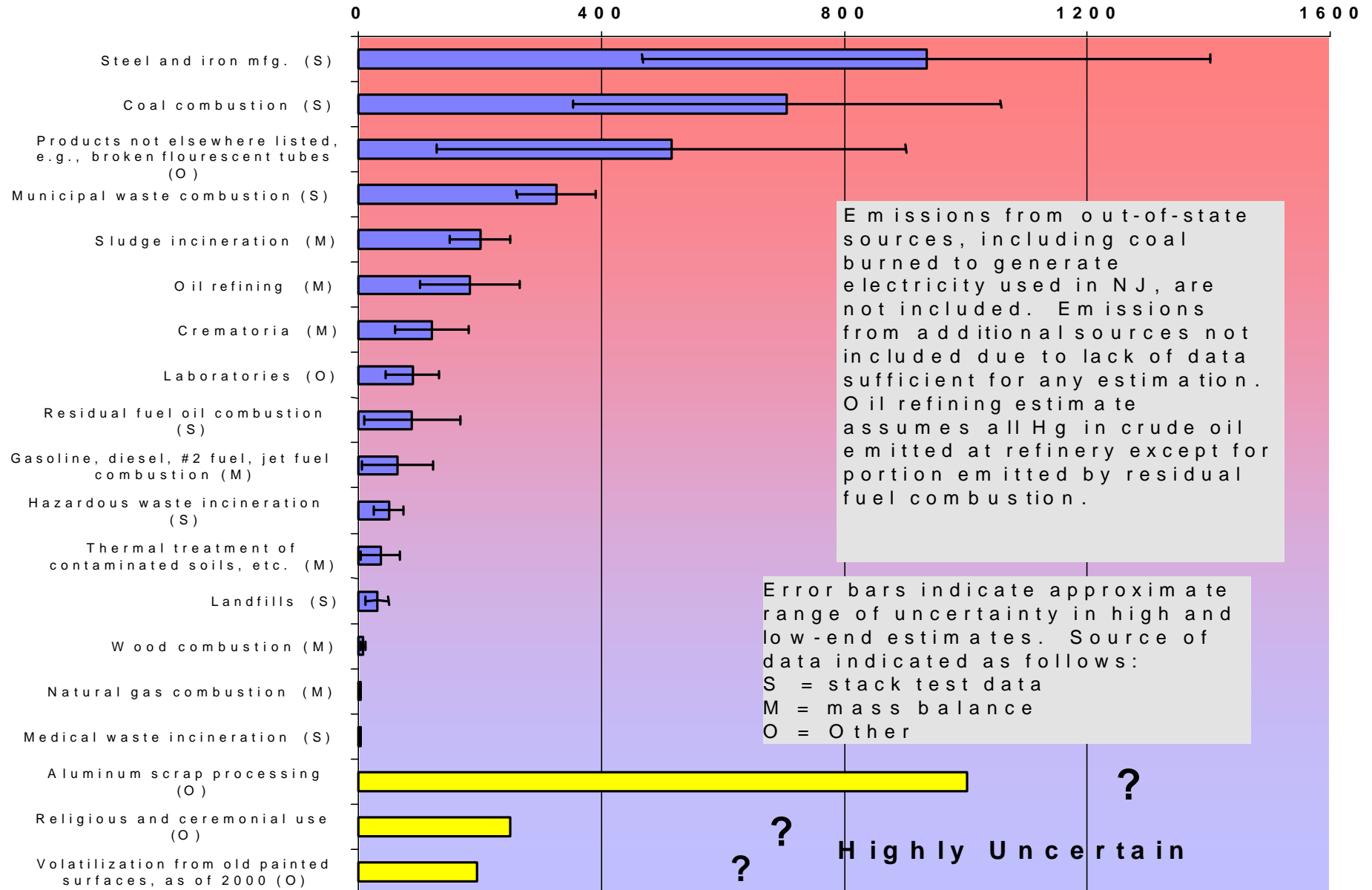
MSW = Municipal Solid Waste

Releases of mercury can be categorized in a variety of ways

- By medium to which release occurs;
air, water, or land
- By type of emissions source;
industrial, commercial, residential, transportation,
agriculture, government, or electricity generation
- By ultimate origin of mercury;
deliberately added to product or incidental
contaminant

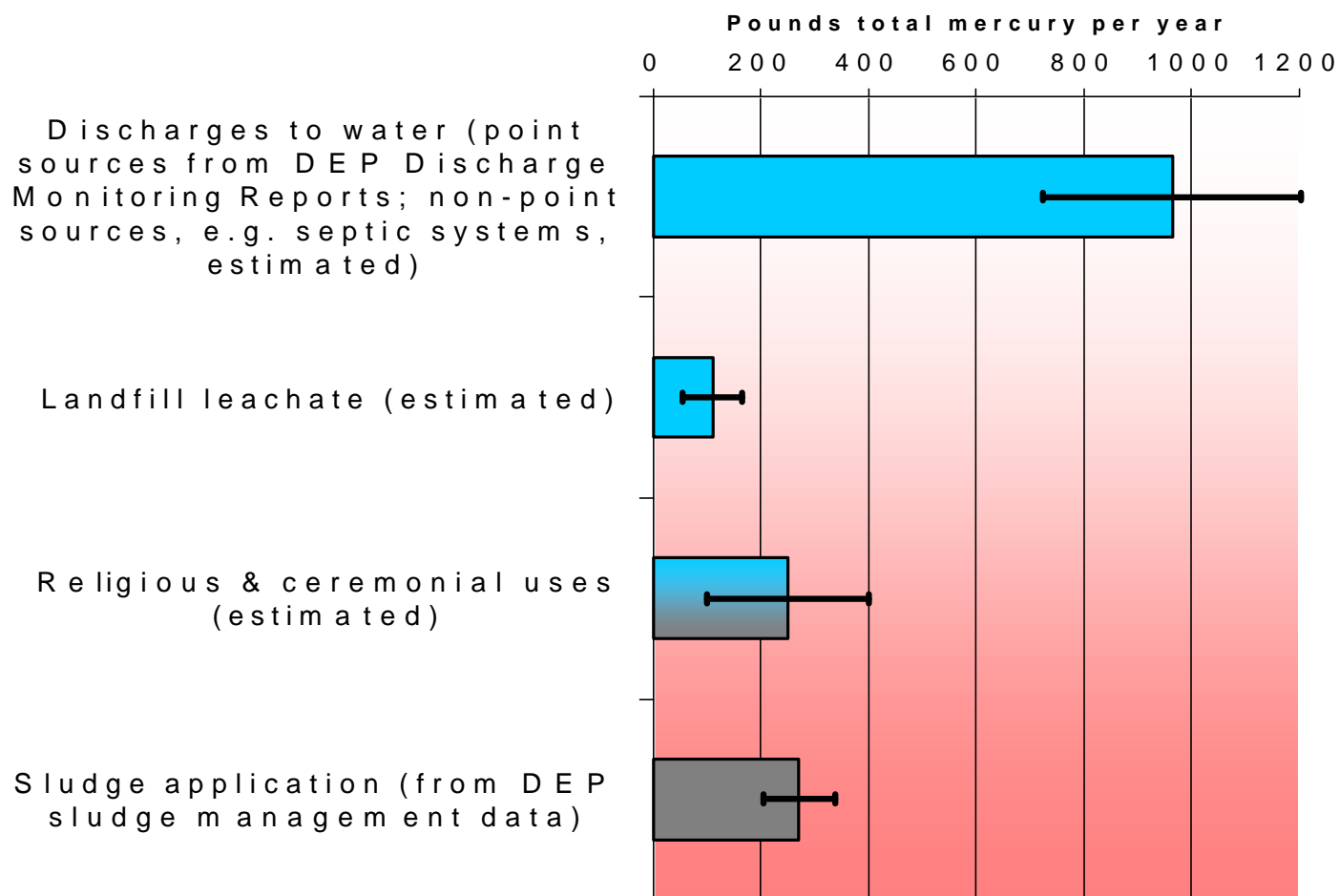
Estimated Mercury Emissions to Air; NJ Sources, lbs/yr

Based on most recent source-specific data; late 90s to 2001

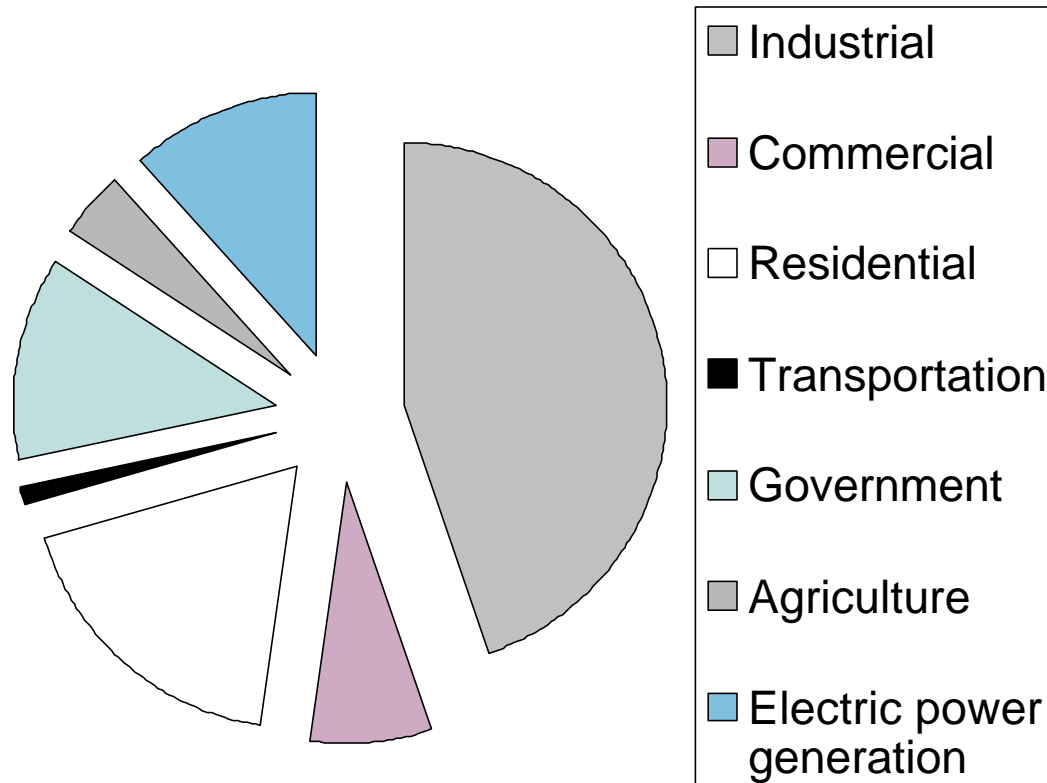


Estimated Anthropogenic Mercury Releases to Water Bodies and Land; NJ Sources

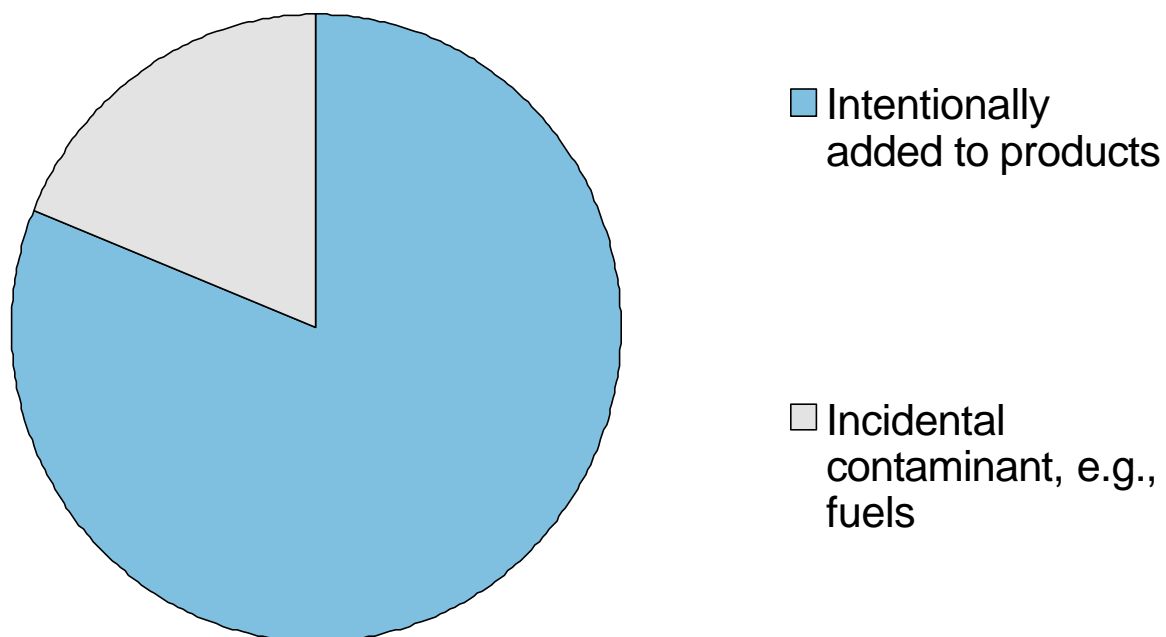
(Based on most recent data; 1997 through 1998)



Estimated 1999 NJ Anthropogenic Mercury Releases to Air, Water, & Land; by Sector



**Estimated 1999 NJ Anthropogenic Mercury
Releases to Air, Water, & Land; by Origin of
Mercury**

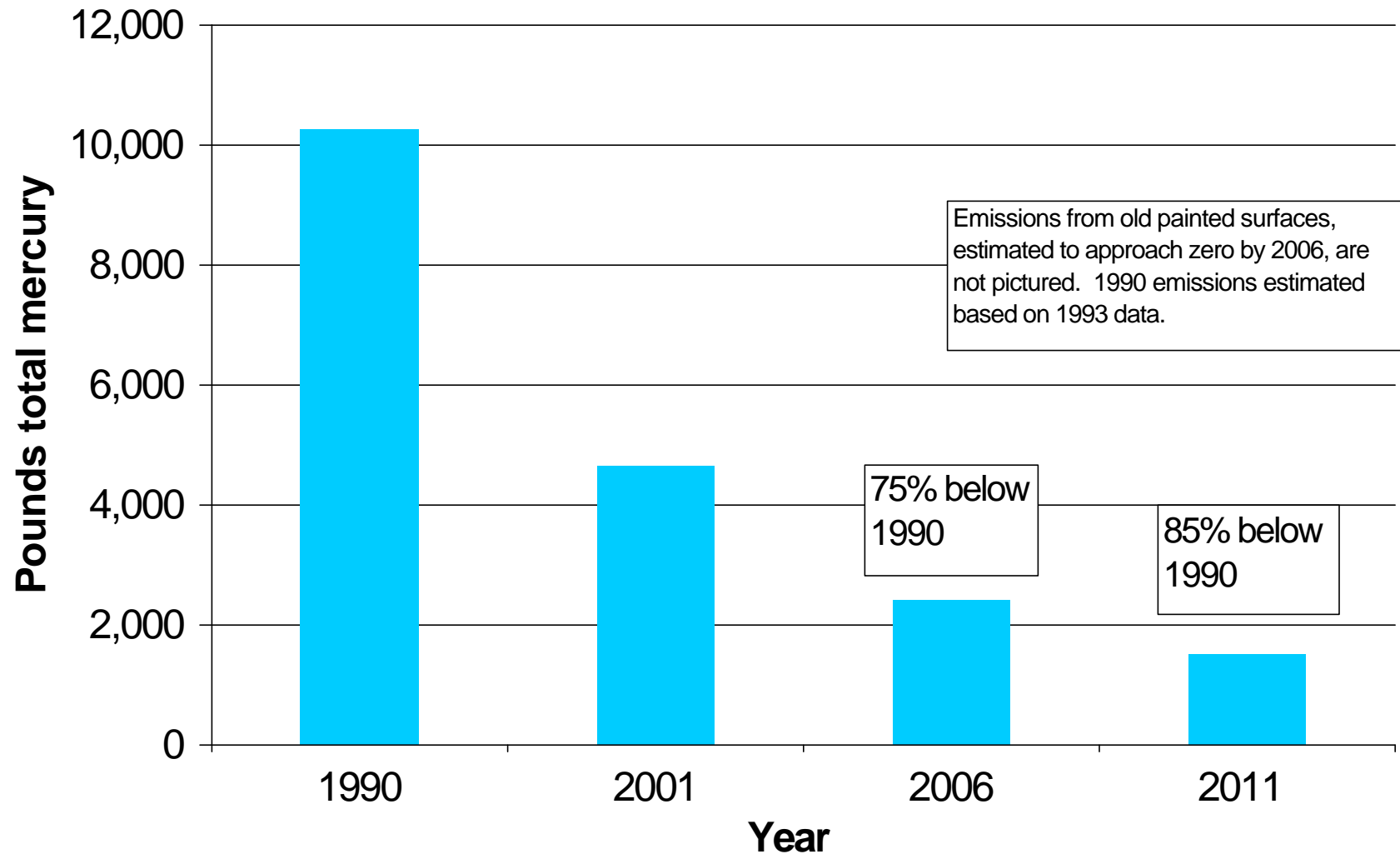


Task Force recommends two-step milestone

- 50 percent reduction in air emissions below estimated 2000 levels by 2006
- 65 percent reduction in air emissions below estimated 2000 levels by 2011
- Variety of reduction approaches will be necessary to meet these goals

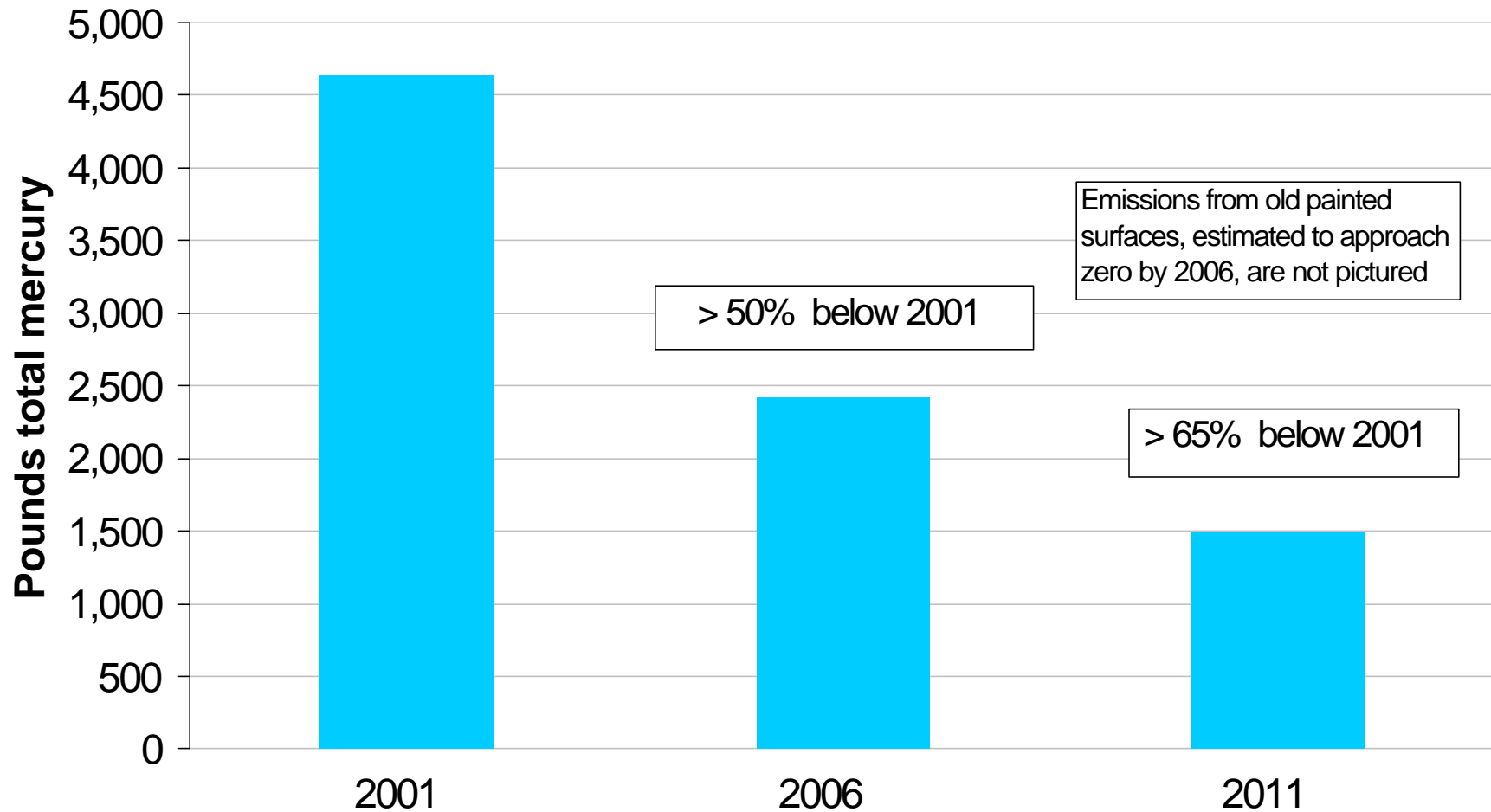
Mercury Air Emissions Goals in NJ:

Projected overall reduction of 75% from 1990 to 2006 and 85% from 1990 to 2011



Mercury Air Emissions Goals in NJ:

Projected overall reduction greater than 50% from 2001 to 2006 and greater than 65% from 2001 to 2011



Reduction recommendations

- Tailored to each source category
- Developed by Task Force Sources Subcommittee through extensive process
- Reviewed and finalized by full Task Force

Recommendations developed with following process:

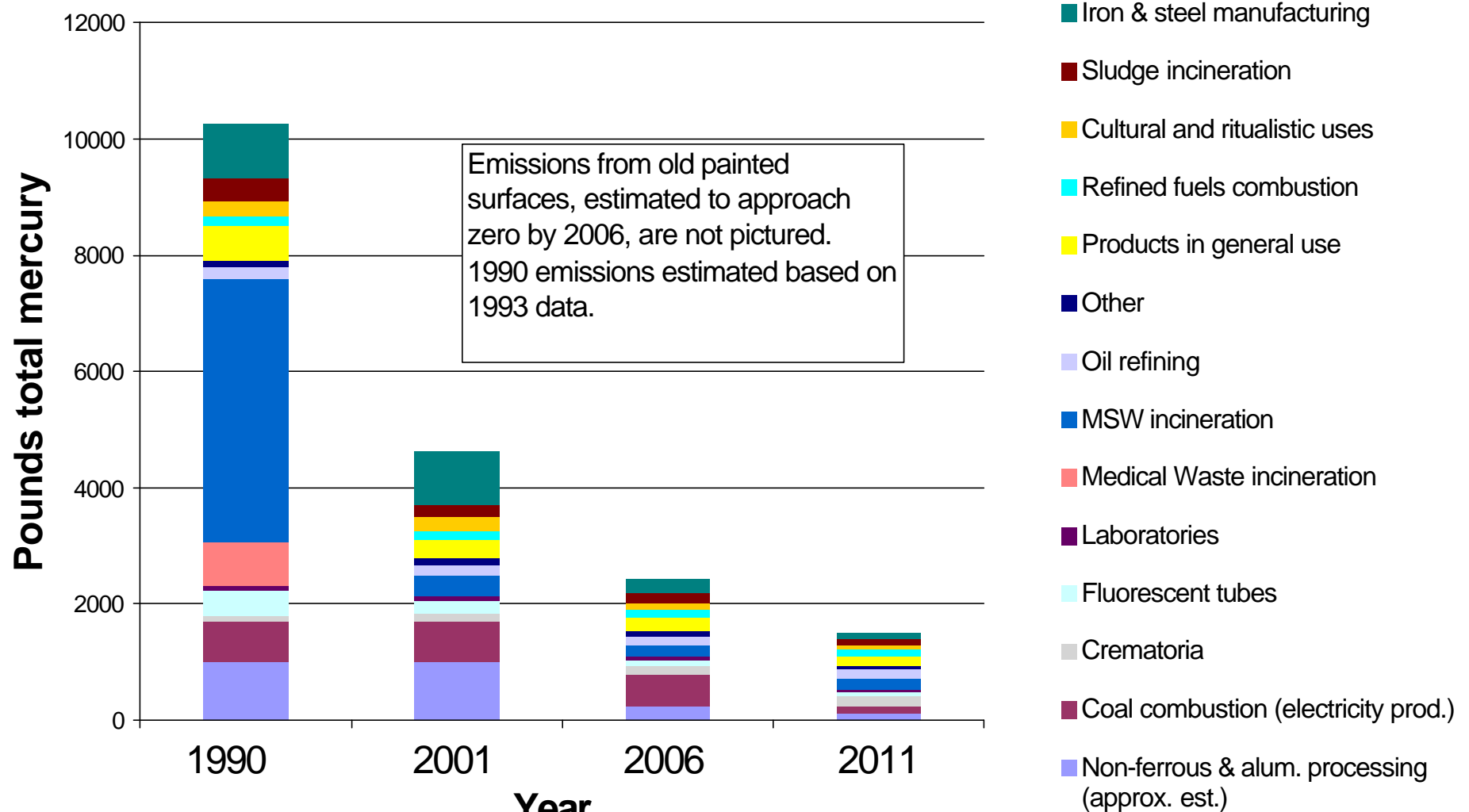
- Identify, describe, and quantify releases from each source
- Identify reduction options for each source
- Estimate feasibility of achieving each option
- Estimate importance of achieving each option
- Prioritize options by feasibility and importance
- Consolidate prioritized options into final list of recommendations
- Full Task Force review and finalize

Future air emissions for each source can be estimated

- Based on projected implementation of Task Force recommendations by NJ DEP and other State agencies
- Including expected reductions resulting from other programs, including NJ Sustainability Greenhouse Gas Action Plan
- Including expected reductions from expected federal standards for coal combustion
- Voluntary measures can play important role

Mercury Air Emissions Goals in NJ:

Projected overall reduction of 75% from 1990 to 2006 and 85% from 1990 to 2011



Mercury Air Emissions Goals in NJ:

Projected overall reduction greater than 50% from 2001 to 2006 and greater than 65% from 2001 to 2011

